

EXERCISE

11B

Backtracking and inverse operations

INDIVIDUAL
PATHWAYS

eBookplus

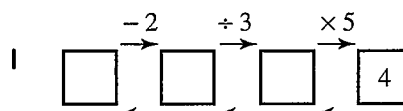
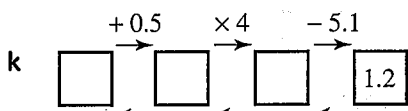
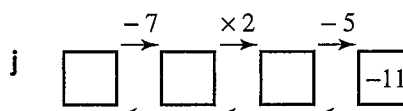
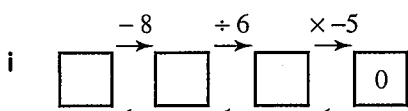
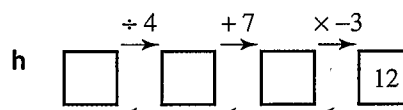
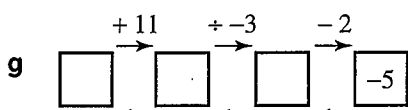
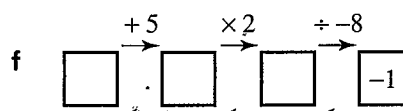
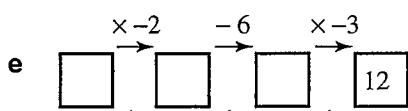
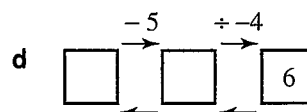
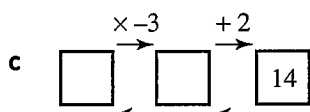
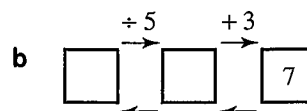
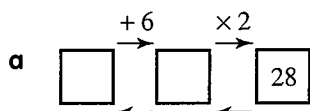
Activity 11-B-1
Sudoku challenge A
doc-2339

Activity 11-B-2
Sudoku challenge B
doc-2340

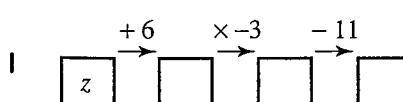
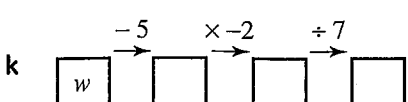
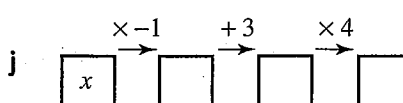
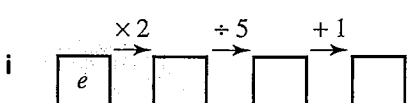
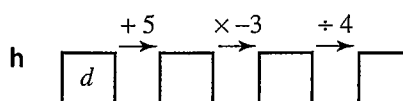
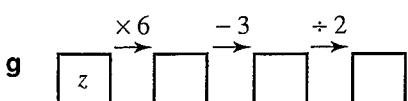
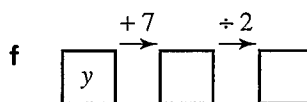
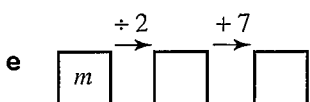
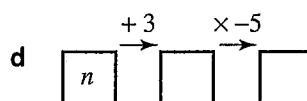
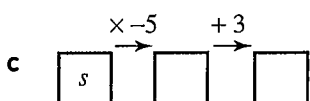
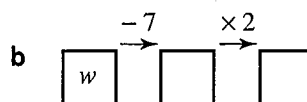
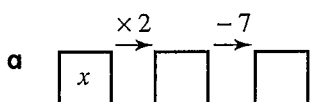
Activity 11-B-3
Sudoku challenge C
doc-2341

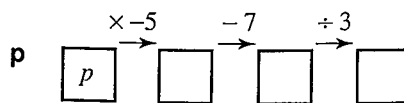
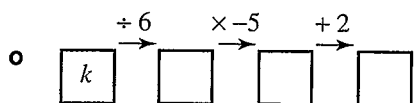
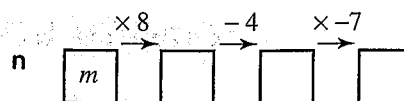
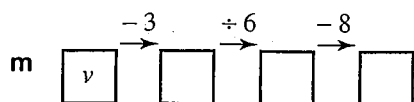
FLUENCY

1 **WE5** Find the input number for each of the following flowcharts.



2 **WE6** Find the output expression for each of the following flowcharts.





3 **WE7** Starting with x , draw the flowchart whose output number is:

a $2(x + 7)$

b $-2(x - 8)$

c $3m - 6$

d $-3m - 6$

e $\frac{x-5}{8}$

f $\frac{x}{8} - 5$

g $-5x + 11$

h $-x + 11$

i $-x - 13$

j $5 - 2x$

k $\frac{3x-7}{4}$

l $\frac{-3(x-2)}{4}$

m $\frac{x+5}{8} - 3$

n $-7\left(\frac{x}{5} - 2\right)$

o $3\left(\frac{2x}{7} + 4\right)$

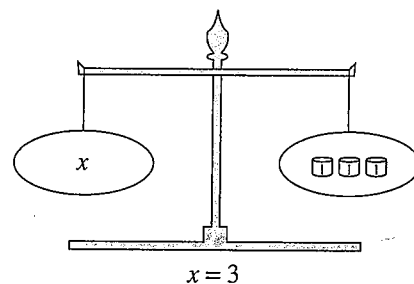
p $\frac{1}{4}\left(\frac{6x}{11} - 3\right)$

REFLECTION

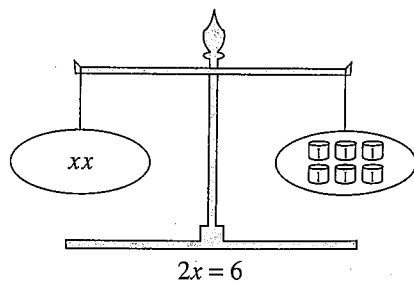
What do you need to be careful of when you are backtracking equations?

11C Keeping equations balanced

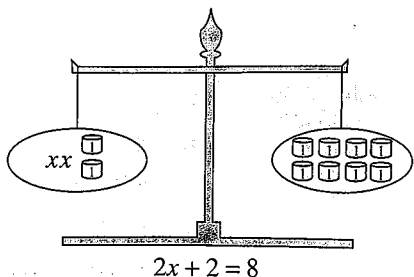
- As an equation can be thought of as two expressions with an equals sign between them, an equation can be thought of as a balanced scale. The diagram at right represents the simple equation $x = 3$.



- If the amount of the left-hand side (LHS) is doubled, the scale will stay balanced provided that the amount on the right-hand side (RHS) is doubled.



- Similarly, the scale will stay balanced if we add a quantity to both sides.
- The scales will remain balanced as long as we do the same to both sides.



REMEMBER

1. A linear equation is an equation where the variable has an index (power) of 1.
2. When solving linear equations, perform the same operations on both sides of the equation until the unknown is left by itself.
3. You can draw a flowchart to help you to decide what to do next.

EXERCISE

11D Using algebra to solve problems

INDIVIDUAL PATHWAYS

eBook plus

Activity 11-D-1
Using algebra to solve problems
doc-2345

Activity 11-D-2
More problems using algebra
doc-2346

Activity 11-D-3
Advanced problems using algebra
doc-2347

eBook plus

Digital doc
Spreadsheet

2-step equations
doc-2353

FLUENCY

1 **WE9a** Solve these one-step equations by doing the same to both sides.

a $x + 8 = 7$	b $12 + r = 7$	c $31 = t + 7$	d $w + 4.2 = 6.9$
e $\frac{5}{8} = m + \frac{1}{8}$	f $\frac{2}{7} = j + 3$	g $q - 8 = 11$	h $-16 + r = -7$
i $21 = t - 11$	j $y - 5.7 = 8.8$	k $-\frac{11}{7} = z - \frac{2}{3}$	l $-\frac{9}{13} = f - 1$

2 **WE9b** Solve these one-step equations by doing the same to both sides.

a $11d = 88$	b $7p = -98$	c $5u = 4$	d $2.5g = 12.5$
e $8m = \frac{1}{4}$	f $-\frac{3}{5} = 9j$	g $\frac{t}{8} = 3$	h $\frac{k}{5} = -12$
i $-5.3 = \frac{l}{4}$	j $\frac{v}{6} = \frac{2}{3}$	k $\frac{c}{9} = -\frac{5}{27}$	l $-\frac{7}{12} = \frac{h}{5}$

3 **WE10a** Solve these two-step equations by doing the same to both sides.

a $3m + 5 = 14$	b $-2w + 6 = 16$	c $-5k - 12 = 8$	d $4t - 3 = -15$
e $2(m - 4) = -6$	f $-3(n + 12) = 18$	g $5(k + 6) = -15$	h $-6(s + 11) = -24$
i $2m + 3 = 10$	j $40 = -5(p + 6)$	k $5 - 3g = 14$	l $11 - 4f = -9$
m $2q - 4.9 = 13.2$	n $7.6 + 5r = -8.4$	o $13.6 = 4t - 0.8$	p $-6k + 7.3 = 8.5$
q $-4g - \frac{1}{5} = \frac{4}{5}$	r $-\frac{3}{8} = 2f - \frac{18}{8}$		

4 **WE10b** Solve these two-step equations by doing the same to both sides.

a $\frac{x}{3} + 2 = 9$	b $\frac{x-5}{4} = 1$	c $\frac{m+3}{2} = -7$	d $\frac{h}{-3} + 1 = 5$
e $\frac{-m}{5} - 3 = 1$	f $\frac{2w}{5} = -4$	g $\frac{-3m}{7} = -1$	h $\frac{c-7}{3} = -2$
i $\frac{-5m}{4} = 10$	j $\frac{t+2}{7} = -5$	k $\frac{c-21}{9} = -4.5$	l $\frac{x}{8} - 3.2 = -5.8$

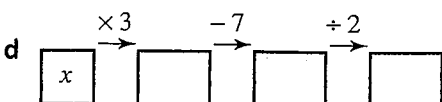
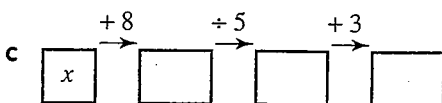
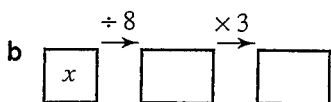
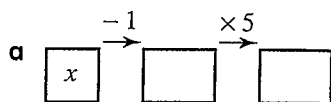
5 **WE11** Solve these equations by doing the same to both sides. They will need more than two steps.

a $2(m + 3) + 7 = 3$	b $\frac{-2(x+5)}{5} = 6$	c $\frac{5m+6}{3} = 4$	d $\frac{3x-2}{7} = 1$
e $\frac{4-2x}{3} = 6$	f $\frac{-x+3}{2} = -4$	g $\frac{3x}{7} - 2 = 1$	h $\frac{4b}{5} - 3 = 5$
i $\frac{7f}{9} + 2 = -5$	j $6 - \frac{4z}{3} = -2$	k $8 - \frac{6m}{5} = 2$	l $-9 - \frac{5u}{11} = -4$
m $\frac{3m-5}{-2} = 7$	n $-7(5w + 3) = 35$	o $5\left(\frac{x}{2} - 6\right) = -10$	p $\frac{d-7}{2} + 10 = 8$
q $\frac{3n+1}{4} - 5 = 2$	r $\frac{3(t-5)}{7} + 9 = 6$		

Chapter review

FLUENCY

- 1 Find the output number for each of these flowcharts.



- 2 Draw the flowchart whose output number is given by the following expressions.

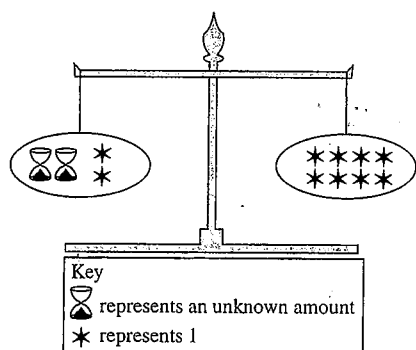
a $-3(m+4)$

b $\frac{n}{3} + 5$

c $\frac{m-7}{5} - 4$

d $7 - 15w$

- 3 a Write an equation that is represented by the diagram below.



- b Show what happens when you take 2 from both sides, and write the new equation.

- 4 **MC** If we start with $x = 5$, which of these equations is not true?

A $x + 2 = 7$

B $3x = 12$

C $-2x = -10$

D $\frac{x}{5} = 1$

E $x - 2 = 3$

- 5 **MC** If we start with $x = 3$, which of these equations is not true?

A $\frac{2x}{3} = 2$

B $-2x = -6$

C $2x - 6 = 0$

D $\frac{x}{5} = \frac{3}{5}$

E $x - 5 = 2$

- 6 Solve these equations by doing the same to both sides.

a $z + 7 = 18$

b $-25 + b = -18$

c $-\frac{8}{9} = z - \frac{4}{3}$

d $9t = \frac{1}{3}$

e $-8.7 = \frac{l}{5}$

f $-\frac{6}{13} = \frac{h}{8}$

- 7 Solve these equations by doing the same to both sides.

a $5v + 3 = 18$

b $5(s + 11) = 35$

c $\frac{d-7}{4} = 10$

d $-2(r + 5) - 3 = 5$

e $\frac{2y-3}{7} = 9$

f $\frac{x}{5} - 3 = 2$

- 8 Solve the following equations and check each solution.

a $5k + 7 = k + 19$

b $4s - 8 = 2s - 12$

c $3t - 11 = 5 - t$

d $5x + 2 = -2x + 16$

- 9 Expand the brackets first and then solve the following equations.

a $5(2v + 3) - 7v = 21$

b $3(m - 4) + 2m = m + 8$